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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,226	07/18/2003	Bruce H.T. Chai	UCF-237DIV	2717
23717	7590	12/31/2003	EXAMINER	
LAW OFFICES OF BRIAN S STEINBERGER 101 BREVARD AVENUE COCOA, FL 32922			LEE, SHUN K	
			ART UNIT	PAPER NUMBER

2878

DATE MAILED: 12/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/623,226

Applicant(s)

CHAI ET AL.

Examiner

Shun Lee

Art Unit

2878

MLW

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 21-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 071803.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Priority*

1. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows:

The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original nonprovisional application or provisional application); the disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

An application in which the benefits of an earlier application are desired must contain a specific reference to the prior application(s) in the first sentence of the specification or in an application data sheet (37 CFR 1.78(a)(2) and (a)(5)). The specific reference to any prior nonprovisional application must include the relationship (*i.e.*, continuation, divisional, or continuation-in-part) between the applications except when the reference is to a prior application of a CPA assigned the same application number.

2. If applicant desires priority under 35 U.S.C. 120 based upon a previously filed application, specific reference to the earlier filed application must be made in the instant application. For benefit claims under 35 U.S.C. 120, 121 or 365(c), the reference must include the relationship (*i.e.*, continuation, divisional, or continuation-in-part) of the applications. This should appear as the first sentence of the specification following the

title, preferably as a separate paragraph unless it appears in an application data sheet. The status of nonprovisional parent application(s) (whether patented or abandoned) should also be included. If a parent application has become a patent, the expression "now Patent No. \_\_\_\_\_" should follow the filing date of the parent application. If a parent application has become abandoned, the expression "now abandoned" should follow the filing date of the parent application.

If the application is a utility or plant application filed under 35 U.S.C. 111(a) on or after November 29, 2000, the specific reference must be submitted during the pendency of the application and within the later of four months from the actual filing date of the application or sixteen months from the filing date of the prior application. If the application is a utility or plant application which entered the national stage from an international application filed on or after November 29, 2000, after compliance with 35 U.S.C. 371, the specific reference must be submitted during the pendency of the application and within the later of four months from the date on which the national stage commenced under 35 U.S.C. 371(b) or (f) or sixteen months from the filing date of the prior application. See 37 CFR 1.78(a)(2)(ii) and (a)(5)(ii). This time period is not extendable and a failure to submit the reference required by 35 U.S.C. 119(e) and/or 120, where applicable, within this time period is considered a waiver of any benefit of such prior application(s) under 35 U.S.C. 119(e), 120, 121 and 365(c). A priority claim filed after the required time period may be accepted if it is accompanied by a grantable petition to accept an unintentionally delayed claim for priority under 35 U.S.C. 119(e), 120, 121 and 365(c). The petition must be accompanied by (1) the reference required

by 35 U.S.C. 120 or 119(e) and 37 CFR 1.78(a)(2) or (a)(5) to the prior application (unless previously submitted), (2) a surcharge under 37 CFR 1.17(t), and (3) a statement that the entire delay between the date the claim was due under 37 CFR 1.78(a)(2) or (a)(5) and the date the claim was filed was unintentional. The Director may require additional information where there is a question whether the delay was unintentional. The petition should be addressed to: Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

### ***Application***

3. This application was filed on 18 July 2003 as a divisional of 09/506,160 filed 17 February 2000 together with a copy of the oath or declaration from the prior application (37 CFR § 1.53(b)). However, applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 (see above). Further, it has been determined that new matter (e.g., Fig. 3 and claims 24-39) is present relative to the prior application (see MPEP § 201.06).

### ***Information Disclosure Statement***

4. It should be noted that the information disclosure statement filed 18 July 2003 fails to comply with 37 CFR 1.98(d) since applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 (see above). Thus the information disclosure statement filed 18 July 2003 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. Applicant should also note that an information

disclosure statement must comply with 37 CFR 1.52. It has been placed in the application file, but the information referred to therein has not been considered.

***Drawings***

5. The drawings are objected to because:
- (a) "PHOTOMULTIPLYER" in Fig. 2 should probably be --PHOTOMULTIPLIER--;
  - and
  - (b) Fig. 3 does not correspond to the description in the specification.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Specification***

6. The disclosure is objected to because of the following informalities:
- (a) on pg. 3, "marker" in the second sentence of the third paragraph should probably be --market--;
  - (b) on pg. 7, "m'o" in line 10 should probably be --two--;
  - (c) on pg. 10, "Fist" in the first sentence of the first paragraph should probably be --First--;
  - (d) on pg. 10, "The first (top) portion the result has many important implications of a crystal will have the least impurity content and thus the best performance." in the second sentence of the first paragraph should probably be --The result has many important implications. The first (top) portion of a crystal will have the least impurity content and thus the best performance.--; and

(e) on pg. 11, "100 C" in line 16 should probably be --100°C--.

Appropriate correction is required.

7. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: (a) claim 24 recite the limitation of mixing  $\text{Lu}_2\text{O}_3$ ,  $\text{Y}_2\text{O}_3$ ,  **$\text{SiO}_3$** ,  $\text{SiO}_2$  together to form a mixture (see specification pg. 8, lines 4-6); (b) claim 29 recite the limitation of ***separating and*** cooling the seed crystal (see specification pg. 8, lines 16-17); (c) claims 30, 34, and 37 recite the limitation transparent; (d) claim 32 recite the limitation wherein said scintillator has a luminescence wavelength of about 420 nm; (e) claim 33 recite the limitation wherein said scintillator has a luminescence decay time of about 35-45 ns; and (f) claims 36 and 39 recite the limitation wherein said photodetector comprises a charge-coupled device.

#### ***Claim Objections***

8. Claim 22 is objected to because of the following informalities: in claim 22, "monocrystalline" on line 2 should probably be --monocrystalline--. Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Berkstresser *et al.* (US 5,164,041).

First, it should be noted that crystal is defined<sup>1</sup> as a "homogenous solid formed by a repeating, three-dimensional pattern of atoms, ions, or molecules and having fixed distances between constituent parts", crystalline is defined<sup>1</sup> as "being, relating to, or composed of crystal or crystals", and mono- is defined<sup>1</sup> as "one; single; alone". Thus a "mono crystal" is a single crystal structure and a "monocrystalline structure" is a structure composed of a single crystal (compare with a polycrystalline structure which is a structure composed of multiple crystals).

In regard to claim **21**, Berkstresser *et al.* disclose a composition comprising a cerium doped lutetium yttrium orthosilicate mono crystal (*i.e.*, a doped  $\text{Ln}_{2-x}\text{RE}_x\text{SiO}_5$  single crystal where Ln is at least one element selected from yttrium (Y) and Lanthanide series rare earth elements with atomic numbers 58 to 71 (Ce-Lu), RE is at least one rare earth element of Lanthanide series with atomic numbers 58 to 71 (Ce-Lu) with RE-ion being different from Ln-ion in the formula, and x is up to 0.3 and wherein the rare earth dopant is selected from Ce, Pr, Nd, Sm, Gd, Tb, Er, Tm, and Yb at up to 15 at. % of the total amount of the Ln and RE components such as a Ce dopant with Ln is Y and RE is Lu; column 2, lines 8-19 and 57-66; column 3, lines 37-45).

In regard to claim **22** which is dependent on claim 21, Berkstresser *et al.* also disclose that the crystal includes: a monocrystalline structure of cerium doped lutetium yttrium orthosilicate,  $\text{Ce}_{2x}(\text{Lu}_{1-y}\text{Y}_y)_{2(1-x)}\text{SiO}_5$  (*i.e.*, the rare earth dopant is Ce, Ln is Y, RE

is Lu, Ce is up to 15 at. % of the total amount of the Y and Lu components, and Lu is up to 0.3; column 2, lines 8-19 and 57-66; column 3, lines 37-45). An overlapping range ( $2x \leq 0.15$  and  $0.7 \leq y < 1$ ) in the prior art which is within a claimed range (*i.e.*,  $x =$  approximately 0.00001 to approximately 0.05 and  $y =$  approximately 0.0001 to approximately 0.9999) anticipates the claimed range (see MPEP § 2131.03).

In regard to claim **23** which is dependent on claim 22, an overlapping range ( $2x \leq 0.15$  and  $0.7 \leq y < 1$ ) in the prior art which is within a claimed range (*i.e.*,  $x$  ranges from approximately 0.0001 to approximately 0.001 and  $y$  ranges from approximately 0.3 to approximately 0.8) anticipates the claimed range (see MPEP § 2131.03).

11. Claim 21 is rejected under 35 U.S.C. 102(b) as being anticipated by Kurata *et al.* (US 5,690,731).

In regard to claim **21**, Kurata *et al.* disclose a composition comprising a cerium doped lutetium yttrium orthosilicate mono crystal (*i.e.*, a Ce doped  $R_2SiO_5$  single crystal where R is at least one rare-earth element selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y, and Sc such as R is LuY; column 7, lines 13-38).

### ***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berkstresser *et al.* (US 5,164,041).

In regard to claims **24-27**, Berkstresser *et al.* disclose a method of making a crystal comprising the steps of:

- (a) mixing raw materials (e.g., substantially pure oxide powders; column 3, lines 35-37) together to form a mixture;
- (b) heating the mixture (column 3, lines 61-64);
- (c) interacting the heated mixture with a seed crystal (column 1, lines 51-65; column 3, lines 25-27); and
- (d) growing a LYSO crystal (*i.e.*, a doped  $\text{Ln}_{2-x}\text{RE}_x\text{SiO}_5$  single crystal where dopant is Ce with Ln is Y and RE is Lu; column 2, lines 8-19 and 57-66; column 3, lines 37-45) from the interaction.

The method of Berkstresser *et al.* lacks an explicit description that the substantially pure oxide powders are  $\text{Lu}_2\text{O}_3$ ,  $\text{Y}_2\text{O}_3$ ,  $\text{SiO}_3$ ,  $\text{SiO}_2$  and that the seed crystal is LSO. However, Berkstresser *et al.* also disclose (column 1, lines 51-65) that the orthosilicate crystals are grown using the well known Czochralski technique from a melt having a desired composition. Berkstresser *et al.* further disclose (column 3, lines 25-27; column 4, lines 1-5) the use of a seed crystal of a desired composition and orientation in order to obtain a desired growth direction. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide LSO seed crystal having a desired orientation and a melt having a desired composition (e.g.,  $\text{Lu}_2\text{O}_3$ ,  $\text{Y}_2\text{O}_3$ ,  $\text{SiO}_3$ ,  $\text{SiO}_2$ ) in the method of Berkstresser *et al.*, in order to obtain a LYSO crystal having a desired composition and growth direction.

In regard to claim **28** which is dependent on claim 24, Berkstresser *et al.* also disclose (column 3, lines 61-64) that the heating step includes heating the mixture to a molten state (*i.e.*, melt).

15. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Berkstresser *et al.* (US 5,164,041) in view of Kurata *et al.* (US 5,690,731).

In regard to claim **29** which is dependent on claim 24, while Berkstresser *et al.* also disclose (column 1, lines 51-65) that the orthosilicate crystals are grown using the well known Czochralski technique, the method of Berkstresser *et al.* lacks an explicit description that the growing step of the Czochralski technique includes separating and cooling the crystal. Kurata *et al.* teach (column 8, lines 1-15) that the growing step of the Czochralski technique includes separating and cooling the crystal. Therefore it

would have been obvious to one having ordinary skill in the art at the time of the invention to separate and cool the crystal in the method of Berkstresser *et al.*, in order to obtain a LYSO crystal using the Czochralski technique.

16. Claims 22-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurata *et al.* (US 5,690,731) in view of Berkstresser *et al.* (US 5,164,041).

In regard to claims **22** and **23** which are dependent on claim 21, the composition of Kurata *et al.* lacks that the cerium doped lutetium yttrium orthosilicate,  $\text{Ce}_{2x}(\text{Lu}_{1-y}\text{Y}_y)_{2(1-x)}\text{SiO}_5$  with  $x =$  approximately 0.00001 to approximately 0.05 and  $y =$  approximately 0.0001 to approximately 0.9999 (or  $x$  ranges from approximately 0.0001 to approximately 0.001 and  $y$  ranges from approximately 0.3 to approximately 0.8). Berkstresser *et al.* teach that a cerium doped lutetium yttrium orthosilicate crystal is  $\text{Ce}_{2x}(\text{Lu}_{1-y}\text{Y}_y)_{2(1-x)}\text{SiO}_5$  (e.g., Ce is up to 15 at. % of the total amount of the Y and Lu components, and Lu is up to 0.3; column 2, lines 8-19 and 57-66; column 3, lines 37-45) in order to obtain a crystal having a desired composition and growth direction (column 1, lines 51-65; column 3, lines 25-27; column 4, lines 1-5). Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the composition (e.g.,  $x =$  approximately 0.00001 to approximately 0.05 and  $y =$  approximately 0.0001 to approximately 0.9999) in the composition of Kurata *et al.*, in order to obtain a LYSO crystal having a desired composition and growth direction.

In regard to claims **24-27**, Kurata *et al.* disclose (column 3, lines 53-64) a method of making a crystal comprising the steps of:

(a) mixing raw materials together to form a mixture;

- (b) heating the mixture;
- (c) interacting the heated mixture with a seed crystal; and
- (d) growing a LYSO crystal (*i.e.*, a Ce doped  $R_2SiO_5$  single crystal where R is at least one rare-earth element selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y, and Sc such as R is LuY; column 7, lines 13-38) from the interaction.

The method of Kurata *et al.* lacks that the raw materials are substantially pure  $Lu_2O_3$ , substantially pure  $Y_2O_3$ ,  $SiO_3$ , substantially pure  $SiO_2$  and that the seed crystal is LSO. Berkstresser *et al.* also disclose (column 1, lines 51-65) that the orthosilicate crystals are grown using the well known Czochralski technique from a melt having a desired composition using substantially pure oxide powders (column 3, lines 35-37). Berkstresser *et al.* further disclose (column 3, lines 25-27; column 4, lines 1-5) the use of a seed crystal of a desired composition and orientation in order to obtain a desired growth direction. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide LSO seed crystal having a desired orientation and a melt having a desired composition (*e.g.*, substantially pure  $Lu_2O_3$ ,  $Y_2O_3$ ,  $SiO_3$ , and  $SiO_2$ ) in the method of Kurata *et al.*, in order to obtain a LYSO crystal having a desired composition and growth direction.

In regard to claim **28** which is dependent on claim 24, Kurata *et al.* also disclose (column 1, lines 22-26) that the heating step includes heating the mixture to a molten state (*i.e.*, melt of the raw material).

In regard to claim **29** which is dependent on claim 24, Kurata *et al.* also disclose (column 8, lines 1-15) that the growing step includes separating and cooling the seed crystal.

17. Claims 30, 31, and 34-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurata *et al.* (US 5,690,731) in view of Berkstresser *et al.* (US 5,164,041) and Fitzpatrick (US 5,500,147).

In regard to claims **30** and **31**, Kurata *et al.* also disclose (column 1, lines 18-20) that the composition is widely used a crystal scintillator. Kurata *et al.* in view of Berkstresser *et al.* is applied as in claims 22 and 23 above, since it is noted that  $\text{Lu}_{(2-\zeta-\xi)}\text{Y}_{\zeta}\text{Ce}_{\xi}\text{SiO}_5$  is equivalently expressed as  $\text{Ce}_{2x}(\text{Lu}_{1-y}\text{Y}_y)_{2(1-x)}\text{SiO}_5$  wherein  $x = \xi/2$  and  $y = \zeta/(2-\xi)$  with  $0.001 \leq \xi \leq 0.02$  and  $0.05 \leq \zeta \leq 1.95$  (or  $0.2 \leq \zeta \leq 1.8$ ) equivalent to  $0.0005 \leq x \leq 0.01$  and  $0.025 \leq y \leq 0.985$  (or  $0.1 \leq y \leq 0.909$ ), respectively. The scintillator of Kurata *et al.* lacks an explicit description that the scintillator crystal is transparent. However, scintillators are well known in the art. For example, Fitzpatrick teaches (column 1, line 62 to column 2, line 8) that a scintillator is desirably transparent in order to transmit scintillation photons. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a transparent crystal in the scintillator of Kurata *et al.*, in order to transmit scintillation photons.

In regard to claims **34** and **37**, Kurata *et al.* in view of Berkstresser *et al.* and Fitzpatrick is applied as in claims 30 and 31 above. Kurata *et al.* also disclose (column 1, lines 27-35) a scintillation detector comprising a photodetector (*i.e.*, photomultiplier)

optically coupled (*i.e.*, fitted) to the crystal scintillator for detecting light from the crystal scintillator.

In regard to claim **35** (which is dependent on claim 34) and claim **38** (which is dependent on claim 37), Kurata *et al.* also disclose (column 1, lines 27-35) that said photodetector comprises a photomultiplier tube.

In regard to claim **36** (which is dependent on claim 34) and claim **39** (which is dependent on claim 37), the detector of Kurata *et al.* lacks that said photodetector comprises a charge-coupled device. However, scintillator photodetectors such as photomultiplier tubes or charge-coupled devices used in scintillation detectors are well known in the art. For example, Fitzpatrick teaches (column 2, lines 63-65) that a photodetector (*e.g.*, photomultiplier tube or charge-coupled device) is optically coupled to a crystal scintillator for detecting light from the crystal scintillator. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention that the photodetector in the detector of Kurata *et al.* is selected from the group of known scintillator photodetectors such as photomultiplier tubes or charge-coupled devices, in order to detect light from the optically coupled crystal scintillator.

18. Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurata *et al.* (US 5,690,731) in view of Berkstresser *et al.* (US 5,164,041) and Fitzpatrick (US 5,500,147) as applied to claim 31 above, and further in view of Melcher *et al.* (J. of Crystal Growth 128:1001-1005, 1993) and Loutts *et al.* (J. of Crystal Growth 174:331-336, 1997).

In regard to claims **32** and **33** which are dependent on claim 31, the scintillator of Kurata *et al.* lacks an explicit description of a luminescence wavelength of about 420 nm and a luminescence decay time of about 35-45 ns. Kurata *et al.* also disclose (column 2, lines 13-21) that the rare-earth oxyorthosilicate lattice has a monoclinic structure. Melcher *et al.* teach (first paragraph of introduction on pg. 1001) that the rare-earth oxyorthosilicate lattice has a monoclinic structure for small rare-earth ions (e.g., Lu, Y). Melcher *et al.* also teach (third paragraph of results on pg. 1003-1004) that luminescence emission in Ce activated material arises from the 5d-4f transitions in  $\text{Ce}^{3+}$  where the 5d level is modified by the rare-earth oxyorthosilicate lattice crystal field. Melcher *et al.* further teach that the Ce activated rare-earth oxyorthosilicate (where the rare earth is either Lu or Y) has a ~420 nm luminescence wavelength (Fig. 3) and a ~35-45 ns luminescence decay time (Fig. 4). Loutts *et al.* teach (conclusions on pg. 336) that most physical properties (e.g., luminescence emission) of combinations of Ce activated rare-earth oxyorthosilicates vary almost linearly with combination. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention that the scintillator of Kurata *et al.* has a ~420 nm luminescence wavelength and a ~35-45 ns luminescence decay time since luminescence arises from the 5d-4f transitions in  $\text{Ce}^{3+}$  as taught by Melcher *et al.* and combinations of small rare-earth ions (i.e., Lu and Y) in a rare-earth oxyorthosilicate monoclinic lattice will have physical properties (e.g., luminescence emission) almost linearly varying with combination as taught by Loutts *et al.*

### ***Double Patenting***

19. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

20. Claims 21-23, 30, 31, 34, 35, 37, and 38 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-7, 11-13, 16, and 17 of U.S. Patent No. 6,624,420. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 21-23, 30, 31, 34, 35, 37, and 38 in the application define an invention that is merely an obvious variation of the invention claimed in the patent.

### ***Conclusion***

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (703) 308-4860. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (703) 308-4852. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

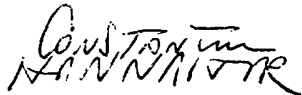
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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SL  
December 17, 2003

  
CONSTANTINE HANNAHER  
PRIMARY EXAMINER  
GROUP ART UNIT 2878